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DURHAM, N.H. - Scientists at the University of New Hampshire's Institute for the Study of Earth, Oceans, and Space (EOS) recently were awarded more than $2.85 million in National Aeronautic and Space Administration (NASA) funds under the agency's Earth Science Interdisciplinary Science (IDS) program.

NASA selected 59 proposals from a field of 348 and awarded grants to researchers from 23 states conducting multi-institution, interdisciplinary scientific investigations. UNH is the lead institution for one project and a collaborating institution for two additional projects.

The IDS research will use the vast wealth of new data from Earth-observing satellites and new computer models to expand the understanding of a variety of aspects of Earth system science.

Berrien Moore, director of EOS and lead scientist for an ambitious three-year, $2.35 million IDS project titled, “Understanding the Changing Carbon, Nitrogen, and Water Cycles in the Earth System,” says the research will not only expand understanding of these critical systems and their role in climate change and global warming, but also will directly benefit UNH students.

“They will be able to participate in cutting-edge research and be exposed to state-of-the-art technologies,” Moore says. Understanding these complex “biogeochemical” cycles is at the heart of the scientific inquiry into climate change. For example, knowing the “carbon balance” of the Earth - how much carbon is stored in forests and in the oceans (carbon “sinks”) and how much is created by both natural and human activities (carbon “sources”) - will help scientists unravel some of the questions about global warming.

Adding complexity to this problem is the fact that carbon is connected to the cycles of nitrogen and water, which also are being altered by humans. The carbon “balance,” in other words, is highly dynamic, with changing sources and sinks influencing each other in an endless interplay of complex physical and chemical processes.

For Moore's project, the global-scale terrestrial and freshwater biogeochemical cycle data will eventually be coupled with the next-generation climate change tool, an advanced Earth System Model (ESM) being developed by the National Oceanic and Atmospheric Administration's (NOAA) Geophysical Fluid Dynamics Laboratory (GFDL) in Princeton, N.J. This state-of-the-art model will incorporate a full range of Earth-system data (oceans, atmosphere, sea ice, land,

etc.) to better understand and predict climate change and its impacts.

Seven other UNH/EOS scientists, including Charles Vörösmarty and George Hurtt, are co-investigators for Moore's project. Vörösmarty and Hurtt also are each co-investigators in separate IDS projects that were funded.

Vörösmarty, director of the Water Systems Analysis Group at EOS and Department of Earth Sciences faculty member, is part of a team, led by the University of Colorado, investigating environmental changes in Arctic water systems. These changes may serve as valuable indicators of global warming and, more importantly, lead to disruptions in the global ocean circulation system that is believed to drive large-scale climate patterns.

Hurtt, an EOS ecologist and faculty member of the Department of Natural Resources, is part of an IDS project at the University of Maryland that will use aircraft-based laser technologies, or "lidar remote sensing," and an advanced terrestrial ecosystem model developed at UNH to study patterns of biodiversity, and the role of forests in the global carbon cycle.

Of the new Earth System Model he is taking part in constructing Hurtt says, "Modeling the Earth system is complicated because atmospheric dynamics are only one part of the puzzle. Progress in science and technology have enabled us to attempt to understand how the land, oceans and atmosphere interact - how the world really works, in other words."